Existing 4"x4" Mounting Post

68"

31"
6"   25"

1 column, rectangular, standard

wall

B (ft) = **5.67**

z (ft) = **20**

s (ft) = **2.08**
h (ft) = **2.58**

grade

2.58333333
5.66666667
2.08333333
11.8055556
0.19791667

Top View

Existing Steel Building Frame

Keeper Rings

New 4.75"x4.75"x.25" Wall Square Tube

.75"x6" A325 Structural Bolt

Existing 4"x4" Mounting Post Tied to Steel Building Frame

.375" Push Thru White Acrylic

8"

Existing 4"x4" Mounting Post Tied to Steel Building Frame

PROPOSED

12' 8"

Michigan, 2015 Michigan Building Code, 2015 IBC
ref 2015 IBC, ref ASCE 7-10

Environmental Conditions

115	Vult (mph), 3 second gust at 33 ft elevation per ASCE , Figure 26.5	
II	**Risk Category;** I, Low; II, Normal; III, Substantial Hazard; IV, Essential/Critical	
C	**Wind Exposure;** C, House size obstructions for > 600 ft; D, no obstructions > 5000 ft	
at corner	Sign **proximity to** corner or on awning	K_{zt} = 4.0

Sign Particulars

2.58	outermost extension **h** (ft) from attachment	OAH
5.67	segment height **B** (ft) (or width if ceiling or horizontal mounted)	2.6
2.08	segment width **s** (ft) (or height if ceiling or horizontal mounted)	5.7
20.00	elevation **z** of sign (ft)	2.083
1	number of attachment columns (usually 1 column per mounting plate)	

Calculated values

11.81 = sign area as ft^2 plus   0.198   = column area as ft^2 giving totals =   12 ft^2

0.90 = K_z, velocity pressure exposure coefficient

1.55 = Cf, force coefficient, orientation Case A & B, clearance ratio per ASCE Figure 29.3-1

103.8 = q_z (psf), velocity pressure at elevation z, using V_{ult}

136.8 = P_{ult} (psf), factored wind pressure, using V_{ult}

985 = F (lb force), wind shear force (ASD) on sign and column area

1,519 = M (lb ft), moment at wall (ASD), total

1,519 = M (lb ft) moment at wall (ASD), per column

4,556 = Shear on bolt (#).

0.66 = section modulus (in^3) required per column per calculated moment at wall

6.4 = section modulus (in^3) provided by tube dimensions   **ACCEPTABLE**

Constants & Formulas: Kd = 0.85, wind directionality factor (attached sign) per ASCE Table 26.6-1; G = 0.85, gust factor (rigid structure), per ASCE , Section 26.11.1; Cpi = n/a, internal pressure coefficient; Kz velocity pressure exposure coefficient = 2.01*(z(15 ft minimum)/Zg)^(2/α), Zg and α from ASCE Table 26.11-1; Kzt topographic factor based on proximity to corner; within h*2 of corner = corner = 4; within h*5 of corner = near corner = 2.5; otherwise midwall = 1.5, or on canopy = 2.0; qz,ult = 0.00256*Kz*Kzt*Kd*V²ult; Pult = qz,ult *G*Cf; Pasd = Pult*0.6; Fseg = Pasd*s*B; M = sum(Fseg) * distance from wall to centroid location; Risk Category II windspeeds from ASCE Figure 26.5-1B, MRI = 700 years; Risk Category III windspeeds from ASCE Figure 26.5-1C, MRI = 1700 years; Section modulus required = moment per column / (material ksi) / 0.6 safety factor, load = 0.6W + D, D ≤ 15 psf.

Aspect ratio = B/s= 2.720	Clearance ratio = s/h= 0.806	Zg= 900	α factor= 9.5
Material ksi (welded) = 46	(unwelded) = 46		
Column tube (pipe) size = 4.75" x 4.75" x 1/4"		column width // to wind (in) = 4.75	
column width ⊥ to wind (in) = 4.75		column thickness (in) = 0.25	

UNO valid for one sign at this location.

- Sign manufacturer/installer's design, detailing, fabrication, and erection shall conform to the following specifications: Building Code, ASTM specifications, ACI-318 for reinforced concrete, American Welding Society Code for Welding in Building Construction, AISC Specification for Design, Fabrication, and Erection of Structural Steel for Buildings.
- Wall material specifications for attachment only (building design and structure is by others):
  - CMU shall be 8" ASTM C90 with fasteners in 1.25" face shell
  - Wood framing shall be 2x4 SPF, 0.42 s. g. w/ fasteners in mid 1/2" of 1.5" edge.
  - Cold Formed steel framing shall be 0.033", 36 ksi with fasteners in flange.
  - Wood Structural Sheathing shall be 7/16" OSB or plywood.
  - Concrete shall be 3000 psi min compressive strength.
- Contractor shall verify all wall materials and construction, dimensions, and conditions in the field before erection, and notify the engineer of any discrepancies.
- Fasteners (all allowable loads are per allowable stress design):
  - ≥ 3/8" A307 STEEL THROUGH BOLTS (CMU, concrete, frame) (as specified in detail)
  - For solid walls, install w/ nut and 3x3x1/4" washer on back of wall
  - For frame walls, install with 2x6 syp #2, 2x2 angle, or 1.5" unistrut continuous blocking on back of wall (continuous blocking must extend past the end of the sign to the next framing member)
  - Allowable tension load = 500 lb.

By using this engineering the owner, manufacturer, and installer accept responsibility to:
•Design, build, and install sign faces, cabinets, raceways, attachment brackets, and electrical, etc. according to sign code, building code, zoning, and UL,
•Verify that site conditions match stated wind speed, risk, exposure, and topo factors, and
•Select approved attachment detail, conforming to this generic attachment engineering, by verifying existing wall, which is not the responsibility of this engineer.
In fact, materials and construction of existing walls is not known at the time of this seal; for this reason various attachment options for various wall construction types are specified.

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STATE OF MICHIGAN
AVINASH B VEERESHA
ENGINEER
No.
6201060322
LICENSED PROFESSIONAL ENGINEER

12 May 2025
This seal for structural engineering
(Attachment ONLY)

SCOPE OF WORK: Establishes minimum structural requirements for attachment of generic signs to wall based on stated (not verified) wind & gravity loads and size & shape, based on sign installer's drawing, attached.

NOTE: THIS SIGN IS ADDING LOAD TO THE EXISTING POST. IT IS THE RESPONSIBILITY OF THE SIGN INSTALLER TO HAVE THE BUILDING DESIGNER VERIFY THAT THE BUILDING CAN SUPPORT THE ADDITIONAL SIGN LOADS, BOTH WEIGHT AND WIND.

GW HOME // GARDNER WHITE

1201 WOODWARD DETROIT, MI 48226

METRO SIGNS & LIGHTING

JOB # 25052

BLADE SIGN
1 Columns, attached to wall